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AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

Please amend claims 1-3 as follows.

1. (Currently amended) In a magnetic read head having an air bearing surface (ABS), a magnetic tunnel junction (MTJ) sensor for connection to sense circuitry for detecting changes in electrical resistance within the sensor, the sensor comprising:

a MTJ stack with an active region disposed at the ABS and having two opposite sides each disposed generally orthogonally to the ABS, the MTJ stack comprising:

a first antiferromagnetic (AFM) layer spanning the active region,

a pinned layer of ferromagnetic (FM) material in contact with the AFM layer.

a free layer of FM material spanning the active region and extending beyond each of the two opposite sides thereof, and

a tunnel junction layer of electrically nonconductive material disposed between the pinned layer and the free layer in the active region; and

a second antiferromagnetic layer formed from an insulating antiferromagnetic material formed on and in contact with the free layer outside of the active region for biasing the magnetic moment of the free layer in substantially a predetermined direction in the absence of an external magnetic field; and

first and second electrically conductive leads, the MTJ stack being sandwiched between the first and second leads, and wherein the free layer is adjacent to the first electrically conductive lead, and the second antiferromagnetic material extends from the free layer to the second electrically conductive lead.

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2. (Previously presented) The sensor of claim 1 wherein said second antiferromagnetic layer is comprised of nickel oxide.

3. (Amended) The sensor of claim 2 wherein said second antiferromagnetic layer is disposed without contacting the active region fills a space between the free layer and the second electrically conductive lead in a region outside of the active region.

Claims 4-46 (Cancelled).

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